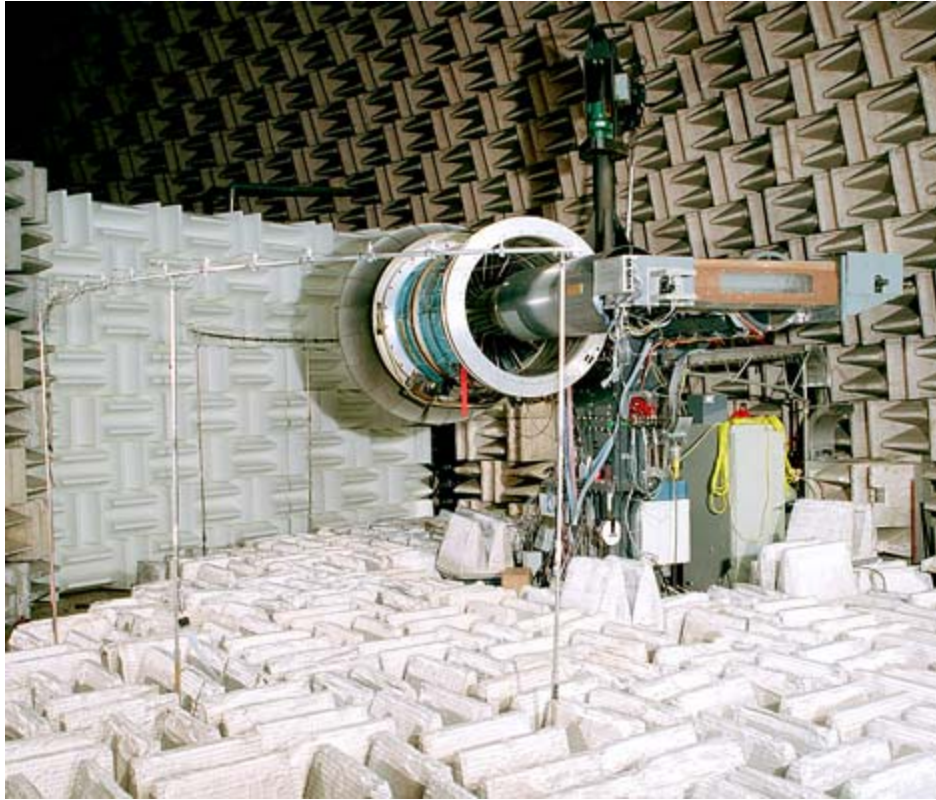


New Acoustic Arena Qualified at NASA Glenn's Aero-Acoustic Propulsion Laboratory



Advanced Noise Control Fan in compact acoustic arena.

A new acoustic arena has been qualified in the Aero-Acoustic Propulsion Laboratory (AAPL) at the NASA Glenn Research Center. This arena is outfitted specifically for conducting fan noise research with the Advanced Noise Control Fan (ANCF) test rig. It features moveable walls with large acoustic wedges (2 by 2 by 1 ft) that create an acoustic environment usable at frequencies as low as 250 Hz. The arena currently uses two dedicated microphone arrays to acquire fan inlet and exhaust far-field acoustic data. It was used successfully in fiscal year 2003 to complete three ANCF tests. It also allowed Glenn to improve the operational efficiency of the four test rigs at AAPL and provided greater flexibility to schedule testing.

There were a number of technical challenges to overcome in bringing the new arena to fruition. The foremost challenge was conflicting acoustic requirements of four different rigs. It was simply impossible to construct a static arena anywhere in the facility without intolerably compromising the acoustic test environment of at least one of the test rigs. This problem was overcome by making the wall sections of the new arena movable. Thus, the arena can be reconfigured to meet the operational requirements of any

particular rig under test. Other design challenges that were encountered and overcome included structural loads of the large wedges, personnel access requirements, equipment maintenance requirements, and typical time and budget constraints.

The new acoustic arena improves operations at the AAPL facility in several significant ways. First, it improves productivity by allowing multiple rigs to operate simultaneously. Second, it improves research data quality by providing a unique test area within the facility that is optimal for conducting fan noise research. Lastly, it reduces labor and equipment costs by eliminating the periodic need to transport the ANCF into and out of the primary AAPL acoustic arena. The investment to design, fabricate, and install the new compact arena in fiscal year 2002 has paid dividends in fiscal year 2003 and will for many years to come. It has provided a dedicated, high-quality acoustic arena to support low-speed fan testing for ANCF while minimizing scheduling impacts and improving operational productivity in the AAPL facility.

Find out more about this research <http://facilities.grc.nasa.gov/>

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Programs/Projects: Propulsion and Power (Fundamental Noise), UEET, QAT